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TITLE: A SMOKE EXPOSURE SYSTEM FOR PRIMATES

AUTHORS: R. B. Griffith* and R. Hancock; A. J. DeLucia and L. R. Bryant

AFFILIATION: University of Kentucky, Tobacco and Health Research Institute, Lexington, KY 40546; and East Tennessee State University, College of Medicine, Johnson City, TN 37601

ABSTRACT: The objective of this work was to design an improved smoke exposure system for use with primates. In this new system, smoke is generated with a single port, reverse puff University of Kentucky smoking machine. The smoke is diluted with air to 50% concentration, and is divided between two, open-ended smoke reservoirs. A primate, fitted with a face mask, is connected to each reservoir with flexible tubing. The primate inhales smoke from the reservoir, through a flutter valve attached directly to the face mask, during the puff or on the first inspiration after smoke generation. Undeposited smoke components are exhaled through the flutter valve into an exhalation reservoir and are then drawn through a Cambridge filter. The differences in concentration of smoke components collected on filters, with and without an animal present, permits an estimate of the smoke intake by the animal and a monitor of each exposure. In one test of the system, with 13 primates, the total particulate matter deposition per animal was found to be 12.4 ± 0.7 mg per cigarette, corresponding to about 1.06 mg/kg/cigrette. Many smoke generation and manipulation variables are possible and the system can be modified for use with other species, especially large animals.

REVIEW: This apparatus designed at the University of Kentucky allows the researcher to measure the smoke delivered by the smoking machine to the mask, without the animals in place; it also measures the exhaled smoke from the animal, allowing the dose of smoke received by the animal to be calculated. Data of actual results contained several outliers which the researcher attributed to possible leaks in the mask. The capability for accurate measurement of the dose of smoke being delivered will allow researchers to look for dose-related responses in animals. This work may have implications for tobacco companies with a need to respond to questions about dose responses: it may be possible to determine smoke doses that are delivered to the smoker when he smokes a cigarette in his normal manner.

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